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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/518,139	12/10/2004	Olivier Bardoux	Serie 5935	5297
7590		03/06/2006	EXAMINER	
Linda K Russell		SAINT SURIN, JACQUES M		
Air Liquide		ART UNIT		
Intellectual Property Department		PAPER NUMBER		
Suite 1800 2700 Post Oak Blvd		2856		
Houston, TX 77056		DATE MAILED: 03/06/2006		

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/518,139

Applicant(s)

BARDOUX ET AL.

Examiner

Jacques M. Saint-Surin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 July 0805 and 10 December 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-6 and 8-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>12/10/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 3 and 7 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim. The expression "in either of claims 1 and 2" must be replaced with --either of claims 1 or 2--. See MPEP § 608.01(n). Accordingly, the claims have not been further treated on the merits.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-2, 4-5, 8, 11-13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (US Patent 3,302,453) in view of Iwamoto et al. (US Patent 6,138,514).

Regarding claims 1 and 8, Wood discloses a method for ultrasonic inspection (system for discovering flaws in a longitudinal weld 10 in a metal pipe 11, see: col. 3, lines 16-18 and Figs. 2 and 3) of welds (10), more particularly welds joining two metal workpieces edge to edge, in which, to inspect the joint:

a) applying the TOFD technique, at least one pair of transducers (transducers T1 and R1), formed from a first transducer (T) and a second transducer (R), one emitting ultrasonic waves (T) and the other receiving ultrasonic waves (R), is moved in the longitudinal or circumferential direction along the weld (10) to be inspected, said transducers (T, R) being positioned laterally on either side of the joint (10) to be inspected and said transducers (T, R) comprising piezoelectric crystals or ceramics (transducing element 12 which may be a quartz piezoelectric crystal, see: col. 3, lines 21-22), so as to detect any flaw (21) in the joint (10) and applying the incline-longitudinal wave or creeping wave (CW) technique, at least one third transducer (R2) is moved along the weld (10) to be inspected so as to detect any flaw. Wood further discloses receiving transducer R2 is mounted upon outer surface 14 in a position to receive waves reflected from flaw 21, and converts the reflected waves into electrical signals in its transducing elements, see: col. 3, lines 62-67). However, Wood does not disclose or suggest the flaw is located at a depth of at least 5 mm, and in the joint located at a depth of between 0.5 and 15 mm. Iwamoto discloses a crack or depth of up to 0.05 mm can be detected by this method, see: col. 4, lines 16-17. Iwamoto further discloses a case where the ultrasonic wave is caused to enter with an angle  $\alpha_1$  of  $40^\circ$  relative to the tube axis and an angle of refraction  $B_1$  of  $60^\circ$  was described, but these angles are

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appropriate for the furnace wall tube 2 of an outer diameter of 38.1 mm and a tube thickness of 5.5 mm, see: col. 4, lines 25-29. It would have been obvious to one having an ultrasonic transverse wave is transmitted from the transmitter probe 6 which is an ultrasonic angle probe for transmission, disposed lower than a crack occurring position of the circumferential crack to be detected on a surface, see: col. 3, lines 54-58. It would have been obvious to one having ordinary skill in the art at the time of the invention to utilize in Wood the techniques of Iwamoto because an ultrasonic wave is caused to propagate, repeating reflections at a tube inner surface and a tube outer surface in a spiral direction on a tube circumferential surface to reach a crack which extends in an axial direction on a furnace outer side thus causing a reflected wave from the crack to propagate on the same side of the transmitter probe to be detected by the receiver probe thereby enabling one to carry out the inspection work more appropriately and with a high efficiency.

Regarding claim 8, as discussed above, it is rejected for the reasons set forth for claim 1.

Regarding claim 2, Wood discloses first and second transducers T and R1 comprise piezoelectric crystals (12) of rectangular shape as shown in Fig. 2.

Regarding claims 4 and 16, Wood discloses in the configuration of Figs. 2 and 3, a continuous examination may be made of weld 10 by moving the testing configuration and the pipe axially with respect to each other, see: col. 5, lines 69-72.

Regarding claim 11, Wood discloses oscillator 15 that performs the analysis for determining or evaluating the depth or length.

Regarding claims 5 and 12, Wood does not disclose a thickness between 5 and 60 mm. As discussed above in claim 1, Iwamoto discloses a thickness of 5.55 mm which is between 5 and 60 mm as required by the claim. It would have been obvious to one having ordinary skill in the art to be motivated recognize the advantages and desirability of utilizing the techniques in Wood of Iwamoto for detecting a flaw within a certain range in a reliable manner.

Regarding claim 13, it is similar in scope with claim 1. Therefore, it is rejected for the reasons set forth for claim 1. Furthermore, Wood discloses a common support (wedge 13 for angular coupling of ultrasonic energy between transducer element 12 and the outer convex surface 14 of pipe 11. The wedges 13 may be of any material suitable for coupling ultrasonic energy between the particular transducing elements used and the particular metal of which pipe 11 is connected. Wood also discloses water 32 as the liquid. Fig. 1 shows wedge 13 holds the transducers T and R1 in place at a certain distance.

5. Claims 9 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (US Patent 3,302,453) in view of Iwamoto et al. (US Patent 6,138,514) and further in view of Alexander et al. (US Patent 5,814,731).

Regarding claims 9 and 17, Wood discloses a third transducer R2 comprising a transducing element 12. However, it does not disclose transducer comprising a wave-emitting ceramic and an ultrasonic wave receiving ceramic. Alexander discloses ultrasonic transducers 12 operate in an ultrasonic energy regime which is generated and received by lead metaniobate piezoelectric ceramics, see: col. It would have been

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obvious to one having ordinary skill in the art at the time of the invention to utilize in Wood and Iwamoto the transducer of Alexander because these ceramics are placed in a mosaic pattern design 21 to create a semi-collimated ultrasonic beam in the interior of the concrete specimen thereby generating and receiving the ultrasonic wave ceramic in an efficient manner.

***Allowable Subject Matter***

6. Claims 6, 10, 14-15 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

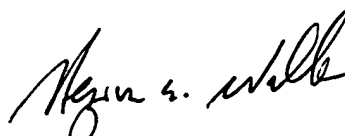
7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacques M. Saint-Surin whose telephone number is (571) 272-2206. The examiner can normally be reached on Mondays through Fridays 10:30 A.M. -7:00 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (571) 272 2208. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jacques M. Saint-Surin  
March 1, 2006



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